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APPLICATION NUMBER: *60/554,743*
FILING DATE: *March 19, 2004*
RELATED PCT APPLICATION NUMBER: *PCT/US05/08261*

Certified by

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PTO/SB/16 (02-01)
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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

Express Mail Label No. EV441452363US

INVENTOR(S)

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Mark Alan	Yoder	Carmel, Indiana
Scott Allen	Rottler	Avon, Indiana

☐ *Additional inventors are being named on the ____ separately numbered sheets attached hereto*

TITLE OF THE INVENTION (280 characters max)

VIDEO PROCESSOR ALIGNMENT CLAMPING SPRING

CORRESPONDENCE ADDRESS

Direct all correspondence to:

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ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Specification *Number of Pages* [2] ☐ CD(s), Number [ ]

☒ Drawing(s) *Number of Sheets* [1] ☐ Other (specify) [ ]

☐ Application Data Sheet. See 37 CFR 1.76

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT *(check one)*

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check or money order is enclosed to cover the filing fees

FILING FEE AMOUNT ($)

☒ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 07-0832 — 160

☐ Payment by credit card. Form PTO-2038 is attached.

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: ____.

Respectfully submitted,

SIGNATURE Patricia A. Verlangieri Date 3/19/04

TYPED or PRINTED NAME Patricia A. Verlangieri REGISTRATION NO. *(if appropriate)* 42,201

TELEPHONE 609 734-6867 Docket Number: PU040076

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C., 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 160

Complete if Known	
Application Number	
Filing Date	
First Named Inventor	Mark Alan Yoder et al.
Examiner Name	
Art Unit	
Attorney Docket No.	PU040076

METHOD OF PAYMENT *(check all that apply)*

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☒ Deposit Account:

Deposit Account Number: 07-0832

Deposit Account Name: THOMSON LICENSING INC.

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filling fee	160

SUBTOTAL (1) ($) 160

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

			Extra Claims		Fee from below		Fee Paid
Total Claims		-20 **	0	X		=	0
Independent Claims		-3 **	0	X		=	0
Multiple Dependent				X		=	0

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0

***or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive – unavoidable	
1453	1,330	2453	665	Petition to revive – unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17 (q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 0

SUBMITTED BY

					Complete *(if applicable)*
Name (Print/Type)	Patricia A. Verlangieri	*Registration No. (Attorney/Agent)*	42,201	*Telephone*	(609) 734-6867
Signature	Patricia A. Verlangieri			*Date*	March 19, 2004

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VIDEO PROCESSOR ALIGNMENT CLAMPING SPRING

FIELD OF THE INVENTION

The invention relates generally to a digital light pulse (DLP™) projection system for use with a microdisplay.

BACKGROUND OF THE INVENTION

At the core of every digital light pulse (DLP™) projection system is an optical semiconductor known as a digital micromirror device (DMD) chip. The mechanical alignment of the DMD chip to the rest of the light engine is critical to properly locating the picture onto the screen.

A special fixture or machine is required to align the DMD assembly (including the heatsink and PC board) to the core optics array. Features are typically built into the assembly for the machine to manipulate the DMD chip so at to align it.

Previous light engine designs have hard mounted the DMD assembly to the optics housing and then adjusted the optical system around the chip position. Since, this alignment is performed visually on the screen by an operator the electronics are live during this alignment and the DMD chip needs to be in focus for the alignment to be performed properly.

DETAILED DESCRIPTION

The present invention provides a controlled clamping force to the DMD assembly, so that it remains in place between the production steps of DMD alignment and the final clamping of the screws. It also provides a positive Z-axis bias to the assembly, to eliminate any tolerance in that direction. This clamping action is accomplished using a stamped steel leaf spring.

The DMD needs to be in the correct Z-axis throughout the alignment process to keep the picture on the screen in focus. This spring system applies adequate pressure to the DMD to keep it in proper focus.

In the present light engine design, the core optics assembly is fixed in location. Therefore, it is necessary to adjust the DMD to the optics for picture alignment. The spring system with DMD alignment is unique in the industry.

The present invention uses a stamped steel piece to act as a leaf spring, as shown in FIG. 1. The spring is compressed by two shoulder screws, which applies a prescribed loading to the DMD assembly for holding it to the optics housing. With this loading applied, the DMD has enough freedom to be manipulated by the alignment machine, but will still be held in place until the system can be locked down.

In one embodiment, four coil springs and four shoulder screws are used to provide force to the system. Also, there is considerable tolerance in the force-deflection curves of the coil springs. Because the four springs act independently, there can be more or less force applied at some of the locations. In another embodiment, the leaf spring acts as a total spring system so that each contact point gets an equal loading force.

PJ040076

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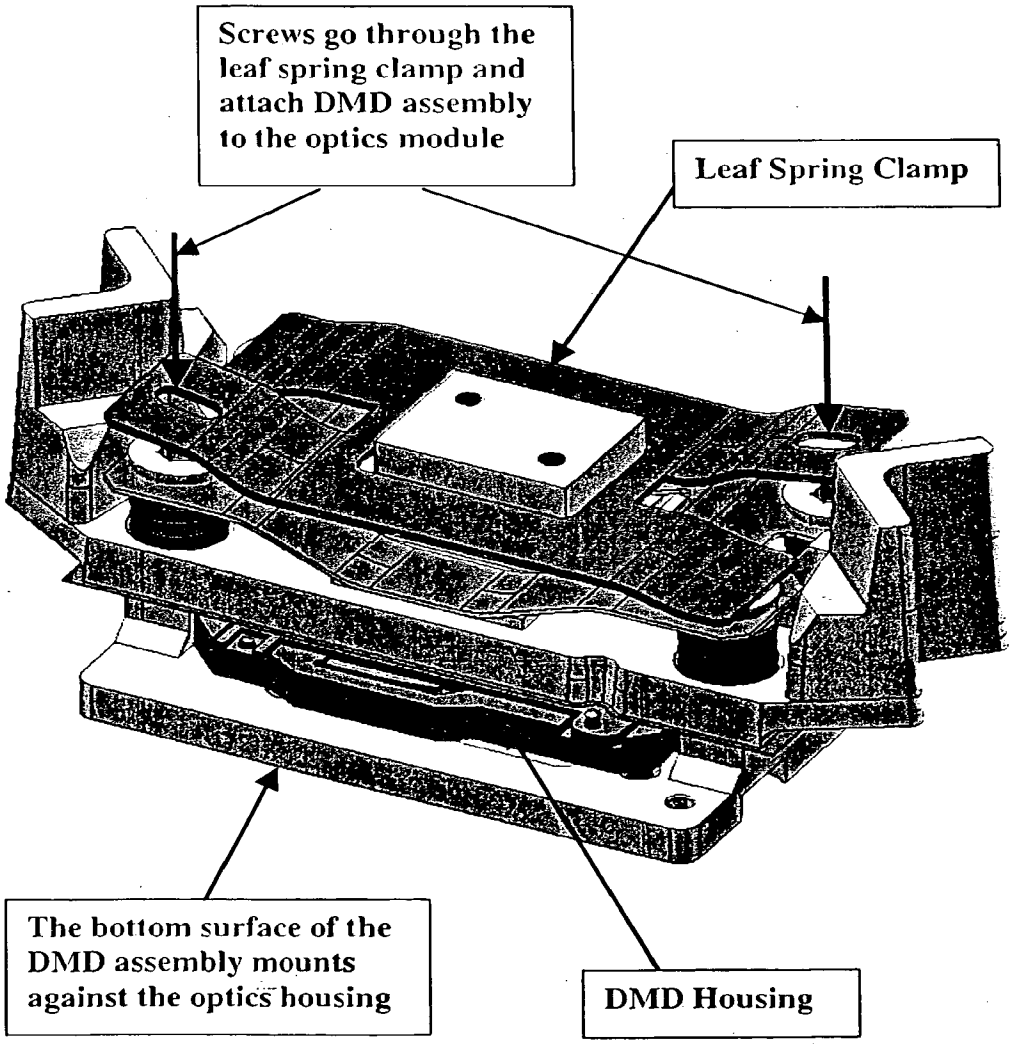

FIG. 1